Jordan Journal of Nursing Research, Volume **5**, No. **2**, **2026**
DOI: https://doi.org/10.14525/JJNR.v5i1.07

Jordan Journal of Nursing Research

https://jjnr.just.edu.jo/jjnr

Evaluation of Knowledge and Attitudes towards Breast Self-examination among Female Secondary School Students

Sara Khalayleh, RN, MSN [1]; Abdullah Alkhawaldeh, RN, MSN, PhD [1 *];

Mohammed ALBashtawy, RN, MPH, PhD [1], Audai A. Hayajneh, RN, CPT, CNS, PhD [2];

Khitam Ibrahem Mohammad, RN, MSN, PhD [3];Mohammad R Alosta, RN, PhD [4]; Islam Ali Oweidat, RN, PhD [4];

Rasmieh Al-Amer, PhD [5]; Wesam Taher Almagharbeh, PhD [6]; Asem Abdalrahim, RN, MSN, PhD [1];

Omar Al Omari, PhD [7]; Imad Abu Khader, MSN, PhD [8]; Basma Salameh, PhD [8];

Khloud Al Dameery, RN, MSN [7]; Nisser Alhroub, PhD [9]

1 *Department of Community and Mental Health, Princess Salma Faculty of Nursing, Al al-Bayt University, Al-Mafraq, Jordan.*
** Corresponding Author. E-mail: dr-abd@aabu.edu.jo*
2 *Department of Adult Health, Faculty of Nursing, Jordan University of Science and Technology, Irbid, Jordan.*
3 *Department of Midwifery, Faculty of Nursing, Jordan University of Science & Technology, Irbid, Jordan.*
4 *Faculty of Nursing, Zarqa University, Zarqa, Jordan.*
5 *Faculty of Nursing, Yarmouk University, Irbid, Jordan.*
6 *Medical and Surgical Nursing Department, Faculty of Nursing, University of Tabuk, Tabuk, Saudi Arabia.*
7 *College of Nursing, Sultan Qaboos University, Muscat, Oman.*
8 *Faculty of Nursing, Arab American University, Jenin, Palestine.*
9 *Faculty of Nursing, Jerash University, Jerash, Jordan.*

ARTICLE INFO

Article History:
Received: October 18, 2025
Accepted: December 28, 2025

ABSTRACT

Background: Breast cancer (BC) remains a major global health concern with significant consequences for women's health. ***Purpose:*** Given the scarcity of evidence focusing on adolescents in Jordan, this study examines the knowledge and attitudes toward Breast Self-examination (BSE) among secondary school female students. ***Methods:*** A cross-sectional design using convenience sampling was employed to recruit 330 female secondary school students in northern Jordan. ***Results:*** The findings revealed that while most students (68.8%) reported some awareness of BC, the overall knowledge was low, with a mean score of 4.7 out of 21, indicating substantial gaps in understanding. Only a small proportion correctly identified key BC risk factors, warning signs, and appropriate BSE practices. Attitude scores reflected a moderate positive attitude toward BSE (mean score = 25.18 out of 60). Regression analysis showed that significant predictors of knowledge included sources of information, family history of BC, and the degree of kinship to the affected relative. Attitudes were significantly associated with father's education level and family relationship to the affected family member, but not with the overall knowledge scores. ***Conclusion:*** This study provides novel evidence highlighting critical deficiencies in BC and BSE knowledge among Jordanian adolescents, with family-related factors emerging as important predictors of both knowledge and attitudes. ***Implications for Nursing:*** As one of the first studies to focus on secondary school girls in Jordan, the findings underscore the pivotal role of school and community health nurses in delivering culturally appropriate education, involving families to reinforce positive attitudes, and advocating for the

integration of BC and BSE content into school curricula. Nursing-led educational interventions during adolescence may strengthen early detection behaviors and contribute to improved long-term community health outcomes.

Keywords: BC, Breast self-examination, Knowledge, Attitudes, Secondary school female students.

What does this paper add?

1. It identifies significant gaps in breast cancer and breast self-examination knowledge among Jordanian secondary school female students, an understudied population in national and regional research.
2. It demonstrates that information sources, family history of breast cancer, and the relationship to an affected relative are key predictors of students' knowledge, while father's educational level and family relationship influence attitudes.
3. It highlights the need for early, school-based breast cancer education by showing that students hold moderate attitudes despite markedly low knowledge levels, emphasizing the importance of integrating awareness into secondary school curricula.

Introduction

Breast cancer (BC) remains a major global health issue affecting women, with lasting physical, psychological, and social consequences for individuals, families, and communities (Wilkinson & Gathani, 2022). Globally, BC is the most frequently diagnosed cancer among women**,** emphasizing the ongoing need for effective prevention and early detection strategies (World Health Organization (WHO), 2023).

BC occurs when breast cells grow uncontrollably, forming a tumor, and early recognition of symptoms plays a critical role in improving survival and treatment outcomes (WHO, 2023). Education on BC risk factors, warning signs, and early detection methods—such as Breast Self-examination (BSE)—has been shown to enhance awareness and promote timely health-seeking behaviors (Alsareii et al., 2020; Friedenreich et al., 2019).

In Jordan, several national and regional initiatives have been implemented to raise BC awareness among women (Ajlouni et al., 2023; Ardiyani et al., 2025). However, these efforts primarily target adult women and largely overlook adolescents**,** despite adolescence being a formative period for developing lifelong health behaviors. Previous Jordanian studies have assessed BC awareness among university students, households, and refugee populations (Al-Najar et al., 2021; Alsaraireh & Darawad, 2018; Atrooz et al., 2023; Kan'an, 2018), yet evidence focusing on secondary school girls remains scarce. This gap is significant, as early exposure to health education can foster preventive behaviors, normalize self-care practices, and establish a foundation for future cancer awareness.

Addressing this gap, the present study focuses specifically on secondary school female students—an understudied and developmentally critical population in Jordan. The study aims to assess knowledge and attitudes toward BSE among students in Al-Mafraq governorate in Jordan. By generating context-specific data on adolescent awareness, this research offers a novel contribution to the Jordanian literature and provides evidence to inform early, school-based BC education and prevention strategies.

Methods

Study Design

A cross-sectional design was used to assess knowledge and attitudes related to BSE among secondary school female students. The study was conducted between May 1 and December 1, 2024.

Study Sample

This study was conducted in Al-Mafraq governorate, Jordan. Four governmental female schools were selected using convenience sampling, based on school size and student diversity. In this study, student diversity referred to variation in socio-economic backgrounds, parental education, and geographic origins within the governorate, as these schools serve students from multiple communities within the governorate. This approach aimed to achieve a heterogeneous sample within a single geographic region. Despite this heterogeneity, the use of convenience sampling and restriction to one governorate limit the generalizability of the findings to other regions of Jordan. Al-Mafraq was selected for practical and public health reasons, as it is among the least served areas regarding breast cancer awareness and school-based health education programs**.** Resource and time constraints

prevented inclusion of additional governorates**,** which would have required expanded coordination, travel, and administrative approvals.

G*Power software (Faul et al., 2009) was used to calculate the required sample size using the formula ($Z^2 \times P \times (1–P))/E^2$), where Z represented the confidence level (1.96), P the expected prevalence (50%), and E the margin of error (0.05). The minimum required sample size was 269 participants (power =0.80, α = 0.05, medium effect size = 0.25 with 10 predictors). An additional 20% was added for potential missing data, resulting in a final required sample of 330 students.

Inclusion Criteria*:* Jordanian female secondary school students aged 16-17 years.

Exclusion Criteria: Non-Jordanian students or those with physical, psychological, or health-related limitations that prevented questionnaire completion.

Sample Recruitment and Eligibility Screening

School administrators first provided class lists of all female students within the eligible age range. Eligibility screening was conducted in collaboration with school administrators to identify students who met the inclusion criteria.

Eligible students were then invited to participate during scheduled class periods, where the study purpose and procedures were explained to them. Only students who returned signed parental consent forms and provided student assent were enrolled. Students who did not return signed consent forms or who were absent during data collection were excluded.

Data Collection

School administrators and instructors were informed about the study purpose and procedures and assisted in coordinating data collection. Parents or guardians received information sheets and consent forms. After obtaining parental consent and student assent, questionnaire forms were distributed and the students completed them either during school hours or returned them the following day.

Instruments

Data was collected using a self-administered questionnaire consisting of three parts:

Part 1: Demographic Characteristics. This part included student age, field of study, parents' demographic information, prior exposure to BC information, sources of information, family history of BC, and the student's relationship to the affected family member.

Part 2: Knowledge of BC and Screening Methods (adapted from Mohebi et al., 2023), comprised 21 items covering BC awareness (6 items), BSE knowledge (9 items)**,** CBE knowledge (3 items)**,** and mammography (3 items). Each correct response received 1 point; incorrect or "I don't know" answers received 0 points. Total scores ranged from 0 to 21 and were categorized as low (0-10), moderate (11-15), or high (16-21).

Part 3: Attitudes toward BC (adapted from Mohebi et al., 2023), included 15 items rated on a 5-point Likert scale (from 0 = strongly disagree to 4 = strongly agree). Total scores ranged from 0 to 60 and were categorized as low (<20), moderate (20-39), or good (≥40).

Ethical Considerations

The study received approval from the University's Institutional Review Board (IRB) (6/5/2024). Participation was voluntary, and students and parents were informed of their right to withdraw at any time without any penalty. Written parental consent and student assent were obtained prior to participation. No identifying information was collected, and anonymity and confidentiality were maintained. Data was stored securely on a password-protected computer accessible only to the research team.

Missing Data Handling

Before conducting analyses, the dataset was screened for missing responses. Cases with more than 10% missing data were excluded. For cases with minimal missing data, mean substitution within the relevant sub-scale was applied. The final dataset included only students with complete or acceptably imputed responses.

Statistical Analysis

Data was analyzed using SPSS, version 26. Descriptive statistics were used to summarize participant characteristics and study variables.

Because knowledge and attitude scores were continuous and approximately normally distributed, parametric analyses were employed. Normality, homoscedasticity, linearity, and multi-collinearity assumptions were assessed and met. Multivariate linear regression analyses were conducted to identify the

predictors of BC knowledge and attitudes, with statistical significance set at $p < 0.05$.

Results

The participants were adolescent female students aged from 16 years to 17 years. The average age of the mothers was 44.66 years (range: 33-59 years), while the fathers had an average age of 49.7 years (range: 34-63 years). Approximately 43.3% of mothers had less than secondary education, and 56.7% had education beyond the secondary level. In contrast, only 2.7% of fathers had less than secondary education, while 97.3% had attained education beyond this level. More than a half of the mothers were employed, and fathers were predominantly employed across various sectors (Table 1).

Overall awareness of BC was moderate. 68.8% of the participants reported some awareness of BC, whereas 31.2% had no prior awareness. Most students lacked a clear source of information, as 70.9% reported no specific source and only 11.2% identified schoolbooks. Reported family history of BC was low, with less than 4% indicating an affected relative (Table 1).

Table 1. Descriptive statistics of sample characteristics (N=330)

Variables	**N**	**Minimum**	**Maximum**	**Mean**	**SD**
Mother's age	330	33	62	44.66	5.551
Father's age	330	34	66	49.7	6.250
Variables	**F (%)**		**SD**		
Student age 16 years 17 years	 173 (52.4%) 157 (47.6%)		0.5002		
Student class First Second	 173 (52.4%) 157 (47.6%)		0.5002		
Mother's education More than secondary school less than secondary school	 187 (56.7%) 143 (43.3%)		0.496		
Mother's job Housewives Employee	 142 (43.0%) 187 (57.0%)		0.496		
Father's education More than secondary school less than secondary school	 321 (97.3%) 9 (2.7%)		0.163		
Father's job Freelancer Employee	 182 (55.2%) 148 (44.8%)		0.498		
Information about BC Yes No	 103(31.2%) 227(68.8%)		0.464		
Source of information School Book TV Doctor and midwife Friend Internet Don't know	 37(11.2%) 15(4.5%) 4 (1.2%) 34(10.3%) 6 (1.8%) 234(70.9%)		1.753		
Family history of BC Yes No	 10 (3%) 320 (97%)		.172		
Family relationship Mother Sister Aunt Negative	 3(0.9%) 5(1.5%) 5(1.5%) 317(96.1%)		.391		

Level of Knowledge of BES among Secondary School Female Students

Overall knowledge of BC and screening practices was low, with several notable gaps. Only 20.6% of students recognized that BC can occur in males, while the majority were uncertain. Knowledge of BC symptoms was particularly limited, as many students failed to correctly identify breast secretions, breast pain, or nipple changes as possible warning signs.

Understanding of BC risk factors was also poor. Fewer than one in seven participants identified age over 40 as a risk factor, and less than 10% recognized family history as significant. Most students were unaware of the association between obesity and BC risk, and misconceptions regarding BC history were common.

Knowledge related to BSE was similarly inadequate. Less than one-quarter knew the recommended starting age, and only 4.8% identified the correct monthly frequency. While 40.6% understood that BSE can be performed by any woman, knowledge of CBE and mammography was limited, particularly regarding recommended age and procedures. The mean BC knowledge score (4.7) confirms an overall low level of knowledge among participants (Table 2).

Table 2. Items and total knowledge score of BES among secondary school female students (N=330)

Items		Frequency	Percent
5Q: on breast cancer awareness			
1. Do only women get BC?			
a. Yes	Incorrect	262	79.4
b. No`	Correct	68	20.6
c. I don't know	I don't know	243	73.6
2. What are the symptoms of BC?			
2.a. Secretion of two breasts			
a. Yes	Incorrect	256	77.6
b. No	Correct	74	22.4
c. I don't know	I don't know	142	43
2.b. Touch the painful mass			
a. Yes	Incorrect	238	72.1
b. No	Correct	92	27.9
c. I don't know	I don't know	115	34.8
2.c. Nipple troughs			
a. Yes	Incorrect	274	83
b. No	Correct	56	17
c. I don't know	I don't know	145	43.9
3.Risk factors for BC			
3. a. Age > 40			
a. Yes	Incorrect	284	86.1
b. No	Correct	46	13.9
c. I don't know	I don't know	178	53.9
3.b. positive FH			
a. Yes	Incorrect	301	91.2
b. No	Correct	29	8.8
c. I don't know	I don't know	237	71.8
3.c. Previous history of BC			
a. Yes	Incorrect	290	87.9
b. No	Correct	40	12.1
c. I don't know	I don't know	226	68.5
3.d. Having children after the age of 30 or not having children			
a. Yes	Incorrect	273	82.7
b. No	Correct	57	17.3
c. I don't know	I don't know	209	63.3
3.e. Premature menarche and late menopause			
a. Yes	Incorrect	307	93
b. No	Correct	23	7
c. I don't know	I don't know	230	69.7
3.f. Obesity			

a. Yes b. No c. I don't know	Incorrect Correct I don't know	309 21 235	93.6 6.4 71.2
4. Do you have information about BSE? a. Yes b. No	 Yes No	 95 235	 28.8 71.2
5. Do you know that BSE is a screening test? a. Yes b. No	 Yes No	 86 244	 26.1 73.9
9Q: on knowledge of breast self-examination 6. Have you had any training on how to do BSE? a. Yes b. No	 Yes No	 84 246	 25.5 74.5
7. If so, by whom? a. Doctor or midwife b. Parents c. Friends d. Teacher e. Internet and cyberspace f. No training	 Doctor or midwife Parents Friends Teacher Internet and cyberspace No training	 18 28 10 61 15 198	 5.5 8.5 3 18.5 4.5 60
8. At what age should BSE begin?	Incorrect Correct	257 76	77 23
9. How often should a BSE be performed?	Incorrect Correct	314 16	95.2 4.8
10. When is the best time to do a BSE?	Incorrect Correct	306 24	92.7 7.3
11. Who should do a BSE?	Incorrect Correct	196 134	59.4 40.6
12. What are the stages of BSE?	Incorrect Correct	244 86	73.9 26.1
13. What do you do if you find something abnormal during a BSE?	Incorrect Correct	173 157	52.4 47.8
14. What are the benefits of BSE?	Incorrect Correct	173 157	52.4 47.6
3Q: on knowledge of clinical examination 15. Who should do the clinical examination?	 Incorrect Correct	 244 86	 73.9 26.1
16. How is the clinical examination performed?	Incorrect Correct	278 52	84.2 15.8
17. How often is a clinical breast examination performed?	Incorrect Correct	278 52	84.2 15.8
3Q: on knowledge of mammography 18. Is mammography useful for early detection of breast cancer?	 Incorrect Correct	 178 152	 53.9 46.1
19. At what age should mammography be started?	Incorrect Correct	315 15	95.5 4.5
20. How often should a mammogram be performed?	Incorrect Correct	282 48	85.5 14.5
Variable		***Mean***	***SD***
Total knowledge score		4.73	3.6

Level of Attitudes of BES among Secondary School Female Students

Overall, attitude scores suggested moderately positive perceptions of BC, although misconceptions persisted. Items related to perceived personal risk (e.g. being young or healthy) showed a tendency to underestimate vulnerability, despite generally favorable mean scores.

Several items reflected misconceptions linking lifestyle factors to reduced need for BSE, such as the

absence of obesity, smoking, or fatty food consumption. These responses suggest confusion between risk reduction and complete risk elimination, rather than outright negative attitudes.

Items addressing emotional responses and perceived severity of BC indicated moderate acknowledgment of BC as a serious condition, although some uncertainty remained. Beliefs regarding BC danger, treatment, metastasis, and heredity also reflected cautiously positive, but not strongly confident, attitudes. The overall mean attitude score (25.18) indicates a moderate level of attitude toward BC and BSE (Table 3).

Table 3. Items and total attitude score of BSE among secondary school female students (N=330)

Variable	Minimum	Maximum	Mean	SD
1. I'm too young to get breast cancer	0	4	1.65	1.4
2. I'm so healthy that my body is resistant to breast cancer; so I do not feel the need for a monthly self-examination	0	4	1.61	1.34
3. No smoking; so no need for monthly BSE	0	4	1.68	1.37
4. No obesity; so no need for monthly BSE	0	4	1.66	1.33
5. No eating fatty foods; so no need for monthly BSE	0	4	1.58	1.35
6. No FH of BC; so no need to practice BSE	0	4	1.64	1.3
7. Not having a stressful life; so no need to practice BSE	0	4	1.61	1.37
8. If I feel pain in my breasts, the fear of breast cancer will take over my whole being	0	4	1.64	1.36
9. I think that breast cancer is a serious disease, because it eventually causes death	0	4	1.74	1.31
10. If I get breast cancer, I may not be able to get pregnant	0	4	1.68	1.33
11. I think that breast cancer is more dangerous than other cancers	0	4	1.66	1.3
12. With timely treatment of breast cancer, a person will have a normal life	0	4	1.61	1.34
13. If I touch a painless lump in my breast, I'm afraid of breast cancer	0	4	1.654	1.303
14. In my opinion, breast cancer is dangerous and in addition to the breast, it spreads the disease to other parts of the body	0	4	1.63	1.36
15. If my mother or sister gets breast cancer, I am at greater risk for breast cancer	0	4	1.61	1.32
Total attitude score	0	60	25.18	16.02

Predictors of Knowledge and Attitudes towards BSE among Secondary School Female Students

Multi-variate regression analysis showed that the model explained 4.3% of the variance in BC knowledge. Attitudes toward BC did not significantly predict knowledge, suggesting that positive perceptions alone are insufficient to ensure accurate understanding.

Information source, family history of BC, and relationship to an affected relative emerged as significant predictors of knowledge, highlighting the importance of exposure to credible information and personal experience. Other demographic variables were not significant (Table 4).

Table 4. Predictors of knowledge toward BSE among north Jordanian secondary school female students

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
Student's class	.035	.307	.005	.114	.909	.983	1.018
Mother's age	-.056	.042	-.086	-1.352	.177	.440	2.272
Mother's education	-.157	.349	-.022	-.450	.653	.775	1.290
Mother's job	.275	.344	.038	.797	.426	.795	1.258
Father's age	.023	.037	.041	.639	.523	.443	2.257
Father's education	-.134	.958	-.006	-.140	.889	.948	1.054
father's job	.178	.309	.025	.576	.565	.977	1.023
Do you have information about breast cancer?	.092	.605	.012	.152	.879	.294	3.402
Source of information about breast cancer	-.380	.160	-.185	-2.379	.018	.296	3.383
Family history of breast cancer (if yes, answer the question below)	-8.733	1.452	-.416	-6.014	.000	.373	2.681
Family relationship of the affected person with the student	-1.847	.635	-.201	-2.910	.004	.377	2.656
Total attitude score	.011	.010	.048	1.102	.271	.931	1.075

The regression model for attitudes explained 7.3% of the variance. Father's education level was the only significant predictor, indicating more favorable attitudes among students with more educated fathers. The relationship to an affected individual showed a marginal association, while BC knowledge itself did not predict attitudes (Table 5).

Table 5. Predictors of attitudes toward BSE among north Jordanian secondary school female students

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
Student's class	1.676	1.748	.052	.959	.338	.983	1.018
Mother's age	.058	.237	.020	.246	.806	.440	2.272
Mother's education	-.084	1.983	-.003	-.042	.966	.775	1.290
Mother's job	.647	1.960	.020	.330	.742	.795	1.258
Father's age	.010	.208	.004	.050	.961	.443	2.257
Father's education	-15.285	5.455	-.156	-2.802	.005	.948	1.054
Father's job	-.724	1.760	-.023	-.411	.681	.977	1.023
Do you have information about breast cancer?	4.343	3.444	.126	1.261	.208	.294	3.402
Source of information about breast cancer	-1.168	.909	-.128	-1.285	.200	.296	3.383
Family history of breast cancer (if yes, answer the question below)	-.572	8.264	-.006	-.069	.945	.373	2.681
Family relationship of the affected person with the student	-6.876	3.613	-.168	-1.903	.058	.377	2.656
Total knowledge score	.352	.319	.079	1.102	.271	.569	1.758

Discussion

Levels of Knowledge of BSE among Female Students at Jordanian Secondary Schools

The findings reveal a consistently low level of BC knowledge among female secondary school students, underscoring the need for targeted educational interventions. This is concerning given the potential role of adolescents in promoting early detection behaviors and reducing stigma. Limited knowledge may hinder future health-seeking behaviors and community awareness (Seran et al., 2022).

Insufficient curriculum coverage and cultural sensitivity around discussing BC may contribute to these knowledge gaps. Similar patterns have been reported internationally, including studies from Oman (Al-Hosni et al., 2023) and Indonesia (Audila et al., 2023), which also documented limited awareness and low BSE practice among adolescents.

Additional evidence from Iran (Mohebi et al., 2023) and Palestine (Khraiwesh et al., 2020) supports these findings, while studies from Ghana (Fondjo et al., 2018) suggest that awareness alone does not ensure adequate knowledge. Collectively, these findings emphasize the need for structured, adolescent-focused BC education, particularly within school settings in Jordan.

Levels of Attitudes of BSE among Female Students at Jordanian Secondary Schools

Attitude scores reflected moderately positive views toward BC, yet misconceptions remained common. Beliefs that youth, good health, or absence of family history eliminate BC risk highlight the need for clearer risk communication.

This moderate positivity may be influenced by informal exposure through media and peer discussions, which can raise awareness, but do not always provide accurate or comprehensive information. Participants generally recognized BC as serious, but expressed concerns related to fertility and personal susceptibility.

Comparable findings have been reported among Ethiopian students (Segni et al., 2016). In contrast, studies in Jordan (Al-Shdayfat et al., 2024) and Iran (Mohebi et al., 2023) reported poorer attitudes prior to intervention. These comparisons reinforce the importance of structured, age-appropriate educational programs to strengthen both knowledge and attitudes.

Predictors of Knowledge and Attitudes of BSE among Female Students

Regression analysis demonstrated that access to information and family exposure to BC were more influential than attitudes in shaping knowledge. This suggests that factual understanding depends more on credible sources than on beliefs alone.

Father's education level emerged as a key predictor of attitudes, highlighting the influence of family and social context on adolescents' health perceptions. The lack of association between knowledge and attitudes suggests that education must be paired with supportive environments to translate information into positive perceptions.

Limitations

A few limitations should be considered when interpreting the findings. First, the cross-sectional design limits causal inference. Additionally, reliance on self-reported data introduces potential biases. The restricted geographic scope and non-random sampling may limit generalizability, and the regression models showed low explanatory power. Measurement bias related to questionnaire wording may also have influenced responses.

Implications for Nursing

The findings underscore the essential role of nurses—particularly school and community health nurses—in advancing BC education among adolescents. Nurse-led, culturally sensitive programs can correct misconceptions, promote accurate BSE practices, and encourage early help-seeking behaviors.

Conclusion

This study demonstrated that while students held moderately positive attitudes toward BC, their knowledge of the disease and screening methods was limited. Information sources and family history were key determinants of knowledge, whereas attitudes were more strongly influenced by family dynamics, particularly paternal education.

These findings support the need for strengthened, school-based BC education and nurse-led health programs. Future research should include more diverse populations and evaluate the effectiveness of tailored educational interventions to improve adolescent BC awareness and early detection behaviors.

Author Contributions

Study Design: **SK, MA**. Data Collection: **AH, NA, KA**. Data Analysis: **OA, IA, BS.** Study Supervision: **AA, SK**. Manuscript Writing: **WA, AA, RA, IO**. Critical Revisions for Important Intellectual Content: **AA, KM, SK, MA**.

Conflict of Interests

No potential or actual conflict of interests was reported by the authors.

Funding or Sources of Financial Support

This research received no funding from any source.

REFERENCES

Ajlouni, B., Al-Nabulsi, A., Issa, S.N., Farha, R.A., Ta'an, R.W., Saleh, S.A., & Mukattash, T. (2023). Evaluating nutrition-related knowledge, attitudes, and practices for the prevention of breast cancer among women in Jordan. *Jordan Journal of Nursing Research*, 2, 289-298.

Al-Hosni, K., Chan, M.F., & Al-Azri, M. (2023). Effectiveness of an educational program on awareness of BC risk factors, symptoms, and barriers to seeking medical help among adolescent Omani school students: An interventional study. *Curr Oncol*, *30*(4), 4126-4138. https://doi.org/10.3390/curroncol30040314

Al-Najar, M.S., Nsairat, A., Nababteh, B., Essam, D., Tarawneh, D., Alrabadi, N., & Alzoubi, K.H. (2021). Awareness about BC among adult women in Jordan [Article]. *SAGE Open*, *11*(4), 1-8. https://doi.org/10.1177/21582440211058716

Alsaraireh, A., & Darawad, M.W. (2018). BC awareness, attitude and practices among female university students: A descriptive study from Jordan. *Health Care for Women International*, *39*(5), 571-583. https://doi.org/10.1080/07399332.2017.1368516

Alsareii, S.A., Alqahtani, S.M., Alamri, A.M., Al-Wadei, H.H., Al-Ammari, S.A., Al-Qahtani, A.M., & Abu-Zaid, A. (2020). Awareness of Breast Cancer among Female Students and Faculty from Najran University, Najran, Saudi Arabia. *Asian Pac J Cancer Prev*, *21*(5), 1415-1422. https://doi.org/10.31557/apjcp.2020.21.5. 1415

Al-Shdayfat, N., Tawalbeh, L., Al-Husban, R., Al-Ajlouni, R., & Abuelashaar, F. (2024). Knowledge, attitudes and practice of BSE among Jordanian women. *Jordan Medical Journal*, *58*(2).

Ardiyani, R. F., Cahyati, Y., Rohmatin, E., Mulyani, N., & Rismawati, S. (2025). Effectiveness of TikTok based health education in improving knowledge of breast cancer and cervical cancer among women of childbearing age. *Jordan Journal of Nursing Research*, *4*(3), Article 05. https://doi.org/10.14525/JJNR.v4i3.05

Atrouz, F., Aljararwah, S. M., Acquati, C., Khabour, O. F., & Salim, S. (2023). Breast Cancer Beliefs and Screening Practices among Syrian Refugee Women and Jordanian Women. *International journal of environmental research and public health*, *20*(4). https://doi.org/10.3390/ijerph20043645

Audila, H., Halim, R., & Butar-Butar, M. (2023). Factors related to breast self-examination (BSE) behavior in female student of public senior high school 1 Jambi city. *Formosa Journal of Applied Sciences*, *2*(4), 579-592.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*(4), 1149-1160. https://doi.org/10.3758/BRM.41.4.1149

Fondjo, L.A., Owusu-Afriyie, O., Sakyi, S.A., Wiafe, A.A., Amankwaa, B., Acheampong, E., . . ., & Owiredu, W.K. (2018). Comparative assessment of knowledge, attitudes, and practice of breast self-examination among female secondary and tertiary school students in Ghana. *International Journal of BC*, *2018*(1), 7502047.

Friedenreich, C/M., Stone, C/R., Cheung, W/Y., & Hayes, S/C. (2019). Physical activity and mortality in cancer survivors: A systematic review and meta-analysis. *JNCI Cancer Spectrum*, *4*(1). https://doi.org/10.1093/jncics/pkz080

Kan'an, A. (2018). Evaluation of BC awareness among female university students in Zarqa university, Jordan. *European Journal of Breast Health*, *14*(4), 199-204. https://doi.org/10.5152/ejbh.2018.4048

Khraiwesh, A., Shakarna, A., & Solimia, S. (2020). Knowledge, beliefs and attitudes of female university students in Palestine toward BC and BSE. *Hebron University Research Journal-A (Natural Sciences)*, *3*(1), 9.

Mohebi, Z., Heidari Sarvestani, M., Moradi, Z., & Naghizadeh, M.M. (2023). Female high school students' knowledge and attitude toward BC. *BMC*

Women's Health, *23*(1), 41.

Segni, M., Tadesse, D., Amdemichael, R., & Demissie, H. (2016). BSE: knowledge, attitude, and practice among female health science students at Adama Science and Technology University, Ethiopia. *Gynecol Obstet (Sunnyvale)*, *6*(368), 2161-0932.

Seran, A.I.L., Blegur, O., & Manafe, E.S.D. (2022). The relationship between female students' knowledge and self-breast examination (SADARI) in early detection of BC. *Jurnal VNUS (Vocational Nursing Sciences)*, *4*(2), 60-66.

Wilkinson, L., & Gathani, T. (2022). Understanding BC as a global health concern. *British Journal of Radiology*, *95*(1130), Article 20211033. https://doi.org/10.1259/bjr.20211033

World Health Organization. (2023, August 14). *Breast cancer*. WHO. https://www.who.int/news-room/fact-sheets/detail/breast-cancer